

AMENDMENT TO THE CLAIMS:

Please cancel claims 6, 7, and 8, and amend claims 3 and 5 as follows:

LISTING OF CLAIMS:

1 and 2. (Cancelled)

3. (Currently amended) A semiconductor device for detecting neutrons comprising:

a semiconductor substrate;

a boron containing layer containing isotope  $^{10}\text{B}$ , the layer being formed on said semiconductor substrate;

a PN junction formed on a surface area of said semiconductor substrate below said boron containing layer, wherein

electron - positive hole pairs are generated in a depletion layer of said PN junction by  $\alpha$  rays generated by a reaction between said neutrons and said isotope  $^{10}\text{B}$ , and the neutrons are detected on the basis of the quantity of electric charge of the electron - positive hole pairs; and

an analyzing circuit portion, which includes [including] a predetermined semiconductor element to estimate an energy spectrum of the  $\alpha$  rays with the aid of counting or by measuring peak height distribution using a current flowing through said PN junction, on said semiconductor substrate in a region other than the region where said neutrons are detected.

4. (Previously amended) A semiconductor device for detecting neutrons comprising:

a semiconductor substrate;

a boron containing layer containing isotope  $^{10}\text{B}$ , the layer being formed on said semiconductor substrate;

a PN junction formed on a surface area of said semiconductor substrate below said boron containing layer; wherein

electron - positive hole pairs are generated in a depletion layer of said PN junction by  $\alpha$  rays generated by a reaction between said neutrons and said isotope  $^{10}\text{B}$ , and the neutrons are detected on the basis of the quantity of electric charge of the electron - positive hole pairs; and

an analyzing circuit portion including a predetermined semiconductor element on said semiconductor substrate in a region other than the region where said neutrons are detected, wherein the concentration of said isotope  $^{10}\text{B}$  in said boron containing layer in said analyzing circuit portion is lower than that of said isotope  $^{10}\text{B}$  of said boron containing layer in the region where said neutrons are detected.

5. (Currently amended) A semiconductor device ~~for detecting neutrons~~ comprising: according to claim 3,

~~a semiconductor substrate;~~

~~a boron containing layer containing isotope  $^{10}\text{B}$ , the layer being formed on said semiconductor substrate;~~

~~a PN junction formed on a surface area of said semiconductor substrate below said boron containing layer; wherein~~

~~electron - positive hole pairs are generated in a depletion layer of said PN junction by  $\alpha$  rays generated by a reaction between said neutrons and said isotope  $^{10}\text{B}$ , and the~~

*cancel*  
*D.C.*  
neutrons are detected on the basis of the quantity of electric charge of the electron-  
positive hole pairs; and

an analyzing circuit portion including a predetermined semiconductor element on  
said semiconductor substrate in a region other than the region where said neutrons are  
detected; wherein no boron containing layer is provided on said analyzing circuit portion.

Claims 6, 7, and 8. (Cancelled)